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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,419	12/31/2003	Young-A Kim	YPL-0071	9573

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EXAMINER	
BABIC, CHRISTOPHER M	

ART UNIT	PAPER NUMBER
1637	

DATE MAILED: 11/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/749,419	KIM ET AL.	
	Examiner	Art Unit	
	Christopher M. Babic	1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *17 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *7/6/2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

Claims 1-13 are pending. The following Office Action is in response to Applicant's response dated October 17, 2005. Any rejection set forth in the NON-FINAL Office Action dated July 29, 2005 not reasserted in the following correspondence is considered withdrawn. All rejections under 35 USC § 112, second paragraph, have been withdrawn in view of claim amendments. Applicant's arguments with respect to the rejection of Claims 1-13 under 35 USC§ 102(b) and 103(a) have been fully considered and are persuasive. However, upon further consideration, a new ground(s) for rejection is made in view of newly discovered prior art. In light of the new grounds(s) for rejection, the finality of the Office Action dated July 29, 2005 is hereby **withdrawn**. The following Office Action is **NON-FINAL**.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-2 and 5-8 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cantor et al (U.S. 5,795,714) in view of Koster et al. (U.S. 6,133,436).

Regarding claim 1, Cantor et al teach a method of replicating a nucleic acid array, the method comprising: (a) manufacturing a template nucleic acid array by immobilizing on a surface of a first substrate first nucleic acid probes (claim 1., column 53, lines 28-33), each of which includes a first polynucleotide that has a sequence complementary to a second polynucleotide to be synthesized and a primer binding site. Due to the inherent nature of polynucleotides, a first polynucleotide will have a second polynucleotide to which it will be complementary. Any sequence contained within the first nucleotide to which a polynucleotide complementary to said first nucleotide may bind may be interpreted as a primer binding site. (b) binding a primer to the primer binding site of each of the first nucleic acid probes immobilized on the surface of the first substrate of the template nucleic acid array (claim 1; column 53, lines 34-36)., (c) in-situ synthesizing a second polynucleotide initiating from the primer using the first polynucleotide as a template (claim 1; column 53, lines 37-38)., and (d) transferring second nucleic acid probes, each of which includes the second polynucleotide and the primer, to a second substrate from the first substrate (claim 1 ; column 53, lines 40-43).

Furthermore, Cantor et al. teach a master array consisting of a set of streptavidin bead-impregnated plastic coated metal pins (i.e. protruding portion), each of which, at its tip, contains immobilized biotinylated DNA strands (Column 21, Lines 59-63). They

and synthesizing the complement with polymerase (Column 21, Lines 64-65). They teach the transfer of the newly synthesized 5'-biotinylated from the master array to the streptavidin-coated replica surface (Column 22, Lines 1-3). They further highlight that the advantage of this scheme is that the master (i.e. template) array is made only once and allows replication to continue endlessly (Column 22, Lines 10-15).

Cantor et al. do not specifically disclose the manufacturing of the *template* (i.e. master) array by bringing the streptavidin bead-impregnated plastic coated metal pins (i.e. protruding portion) into a solution of biotinylated DNA strands located in a recessed portion of another uneven substrate (e.g. well, concave cavity).

Koster et al. disclose a pin-tool in a 4x4 array (Figure 8) wherein nucleic acid can be directly captured onto the pin-tool, for example, a linking functionality on the pin-tool (e.g. streptavidin) can *immobilize* the nucleic acid upon contact (Column 8, Lines 6-8). They further disclose that immobilization can result from application to the pin-tool of an electric field (Column 8, Lines 8-10). Figure 14 clearly shows a pin (i.e. protruding portion) coming into contact with a solution of nucleic acid contained in a recessed portion of another substrate (e.g. concave cavity) in order to *immobilize* the nucleic acid onto the pin.

Based on the combined disclosures of Cantor et al. and Koster et al., one of ordinary skill in the art at the time of invention would have had a reasonable expectation of success practicing a method of replicating a nucleic acid array by the methods of Cantor et al. further comprising bringing the streptavidin bead-impregnated plastic coated metal pins (i.e. protruding portion) into a solution of biotinylated DNA strands

located in a recessed portion of another uneven substrate (e.g. concave cavity) in order to immobilize the template array. The disclosure of Koster et al. clearly would have provided the instruction necessary for one of ordinary skill in the art at the time of invention to immobilize a nucleic acid array on a protruding substrate by bringing it into contact with a solution of nucleic acid contained in a recessed portion of another substrate (e.g. concave cavity). The motivation to manufacture the template array for use in the methods of Cantor et al. would have been to create a master array, through a one-time procedure, for continuous manufacture of replica arrays. It would have been *prima facie* obvious for one of ordinary skill in the art at the time of invention to practice the methods as claimed.

Regarding claims 2 and 11, Cantor et al teach the first and second substrates are previously surface-treated, i.e. coating the surface (column 15, lines 23-28).

Regarding claim 5 and 12, Cantor et al teach the use of universal primers, i.e., the complement of the common region (column 4, lines 26-29; column 4, lines 48-61; column 33, lines 44-46).

Regarding claim 6, Cantor et al teach attaching to a terminal of the primer one of a functional group and a material that can bind to a surface of the second substrate, e.g. streptavidin/biotin (column 15, lines 23-28).

Regarding claim 7, double-stranded DNA is held together via hydrogen bonding. Cantor et al teach denaturation of double stranded nucleic acids (column 53, line 40) and therefore teach cleaving hydrogen bonds between the first and second polynucleotides before step (d).

Regarding claim 8, Cantor et al teach repeated use of the template nucleic acid array to produce a number of nucleic acid arrays (column 14, lines 5-8).

2. Claims 3-4, 9-10, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cantor et al (U.S. 5,795,714) in view of Koster et al. (U.S. 6,133,436), in further view of Dickinson et al (U.S. 6,770,441).

Regarding claims 3, 9-10, and 13, the methods of Cantor et al. and Koster et al. have been outlines in the above rejection. Neither Cantor et al. or Koster et al. specifically disclose a metallic pattern formed on the substrates. Dickinson et al teach the first and second substrates are previously patterned or surface-treated, i.e. metal-coated for the advantage of enhanced signal collection from the arrays (column 10, lines 18-20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to combine the teachings of Dickinson et al and Cantor et al to fabricate a nucleic acid array with a metallic pattern on the substrate for the advantage of "enhanced signal collection from the arrays" (Dickinson et al, column 10, lines 18-20). Thus, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the claimed invention was made.

Regarding claim 4, Cantor et al teach the use of streptavidin/biotin (column 15, lines 23-28).

Conclusion

No claims are allowed. No claims are free of the prior art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Babic whose telephone number is 571-272-8507. The examiner can normally be reached on Monday-Friday 7:00AM to 4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 571-272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

11/1/05

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KENNETH R. HORLICK, PH.D
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11/14/05